

REQUEST FOR RECONSIDERATION

The claimed invention is directed to a process for the preparation of dendritic or hyperbranched polyurethanes, dendritic or hyperbranched polyurethanes and methods for producing reaction products of dendritic or hyperbranched polyurethanes.

Dendritic or hyperbranched polyurethanes have found industrial applicability but have suffered from costly and complex preparation techniques. Simpler and less costly techniques are sought.

The claimed invention addresses this problem by providing a method for preparing dendritic or hyperbranched polyurethanes by reacting diols or polyols having 1) at least one tertiary nitrogen atom; and 2) at least two hydroxyl groups, **having differing reactivity** toward isocyanate groups, with diisocyanates or polyisocyanates. Applicants have discovered that reaction of diols or polyols having at least one tertiary nitrogen atom and at least two hydroxyl groups, **having differing reactivity** toward isocyanate groups to provide a simple method for the preparation of dendritic or hyperbranched polyurethanes. Such a process and dendritic or hyperbranched polyurethane are nowhere disclosed or suggested in the cited reference of record.

The rejection of claims 1-20 under 35 U.S.C. § 102(b) over Nakamura et al. WO 01/16203 as evidenced by Nakamura et al. 2003/0225239 is respectfully traversed.

Applicants note that Nakamura et al. 2003/0225239 was filed with the U.S. patent office on April 10, 2003, prior to applicants' German priority date of May 16, 2003. As such applicants' arguments are concurrently directed to the disclosure of Nakamura et al. 2003/0225239.

Nakamura et al. fail to disclose or suggest diols or polyols having at least one tertiary nitrogen atom and at least two hydroxyl groups, **having differing reactivity** toward isocyanate groups.

Nakamura et al. describes a Michael addition type urethane urea resin in which (a) a polyol, (b) a polyisocyanate, (c) a polyamine and (d) an unsaturated compound are reacted (paragraph[0006]). In one embodiment, polyol (a) and polyisocyanate (b) are reacted to form a urethane prepolymer (A) which is reacted with a Michael addition product (B) of polyamine (c) with unsaturated compound (d). In an alternate embodiment polyol (a), polyisocyanate (b) and polyamine (c) are reacted to form a polyurethane urea (C) which is reacted in a Michael addition with unsaturated compound (d).

Polyol (a) is described beginning at paragraph [0052] and paragraph [0062] describes the use of a polyol having a quaternary ammonium group or tertiary amine group. Suitable compounds are exemplified in paragraph [0063] as N,N-bis(2-hydroxypropyl)aniline and N-methyldiethanolamine. There is no disclosure or suggestion of diols or polyols having at least one tertiary nitrogen atom and at least two hydroxyl groups, **having differing reactivity** toward isocyanate groups. To the contrary the hydroxyl groups in the amino compounds of paragraph [0063] are symmetrically situated and would therefore have **the same** reactivity.

In contrast, the claimed invention is directed to a process in which the diols or polyols have at least one tertiary nitrogen atom and at least two hydroxyl groups, **having differing reactivity** toward isocyanate groups. Such differential reactivity allows for a two-stage selective reaction. Applicants note that claim 1 has been amended to further clarify the dichotomy of hydroxyl group reactivity by reciting the predominant reaction of the more reactive hydroxyl groups in step 1) and the less reactive hydroxyl groups in step 2). Applicants' amendment is not a narrowing amendment made for the purposes of patentability as the amendment merely articulates the predominant timing of reactivity resulting from having hydroxyl groups having different reactivity.

Moreover, it would not have been obvious to react diols or polyols having at least one tertiary nitrogen atom and at least two hydroxyl groups, **having differing reactivity** toward

isocyanate groups as the reactions described by Nakamura et al. would not take advantage of any differential reactivity in the hydroxyl groups.

For example, polyol (a) and polyisocyanate (b) are merely reacted to form a urethane prepolymer having a terminal isocyanate group (paragraph[0009]). The terminal isocyanate group is then reacted with the Michael addition product of polyamine (c) with unsaturated compound (d). No further reaction of hydroxyl groups is described, only reaction of a terminal isocyanate group. Since the urethane prepolymer is only described as having a terminal isocyanate group, there is no suggestion of reacting an amino polyol having hydroxyl groups of differential reactivity.

Likewise the embodiment in which polyol (a), polyisocyanate (b) and polyamine (c) are reacted then subjected to Michael addition reaction with unsaturated compound (d) fails to suggest reaction of an amino polyol having two hydroxyl groups of differential reactivity as no further reactivity of hydroxyl groups is described.

As the cited reference fails to disclose or suggest diols or polyols having at least one tertiary nitrogen atom and at least two hydroxyl groups, **having differing reactivity** toward isocyanate groups, the claimed invention is neither anticipated nor rendered obvious by this reference and withdrawal of the rejection under 35 U.S.C. §102(b) is respectfully requested.

The rejections of claim 10 under 35 U.S.C. §112, second paragraph and 35 U.S.C. §101 have been obviated by appropriate amendment. Claim 10 has been amended to recite a reacting step. In view of applicants' amendment withdrawal of these grounds of rejection is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

A handwritten signature in black ink, appearing to read "Richard L. Chinn", written over a horizontal line.

Richard L. Chinn, Ph.D.
Attorney of Record
Registration No. 34,305

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/07)